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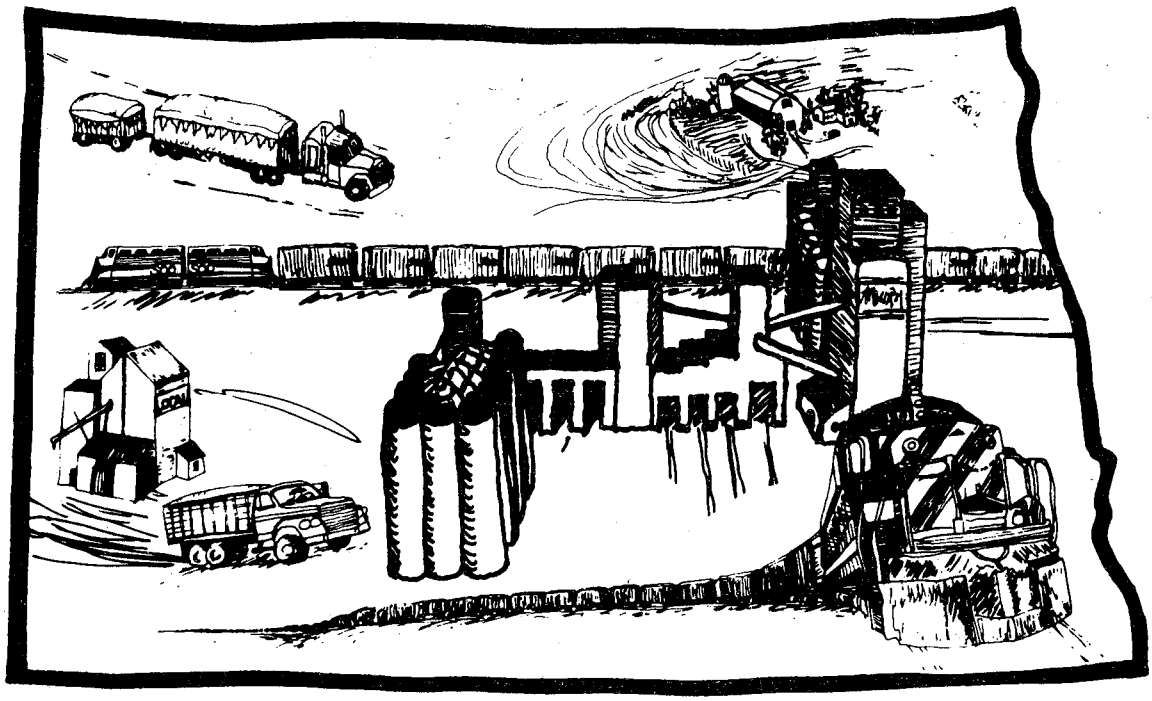
AN ANALYSIS OF SHIPPER LEASED RAIL EQUIPMENT IN NORTH DAKOTA



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Highlights

Country elevators have frequently experienced problems in getting grain produced in North Dakota to market. Rail car shortages throughout much of the 1970s particularly plagued the ability of elevator managers to move grain. In response to these problems, managers began to purchase and lease transportation equipment. The most popular alternative selected by North Dakota grain shippers was to lease jumbo covered hopper cars.

The purpose of this report is to examine the use of leased and privately owned covered hopper cars by grain elevators in North Dakota. The number of country elevators leasing covered hopper cars increased from 31 in 1975 to 175 in 1980. Only 12 firms owned hopper cars in 1980. The use of leased rail equipment generally represents an additional marketing cost to elevators. Rail cars earn mileage credits based on the loaded mileage traveled; but it is difficult to earn revenues in excess of the cost of the lease for at least two reasons. First, car leasing companies often restrict mileage credits to the amount of the lease payment. And second, it is extremely difficult to get sufficient utilization from leased equipment; particularly on shipments to Minneapolis/St. Paul and Duluth/Superior destinations. Leasing covered hopper cars generally represents a lower cost alternative to most country elevators in North Dakota compared to purchasing. Based on the survey results, the annual average cost of leasing a single covered hopper car is about .24 cents per bushel. The cost of purchasing a single hopper car is approximately .4 cents per bushel.

AN OVERVIEW

North Dakota Grain Handling, Transportation, and Merchandising Study

North Dakota's railroad branch line system was developed in the late 1800s and early 1900s, primarily for the purpose of moving farm commodities to markets outside the state and to bring freight such as farm inputs and other needed goods to the state's communities. The only other form of surface transportation available for moving bulk freight when the rail network was being developed (excluding some minor river transportation) was the horse-drawn freight wagon. The limited distance that a team of horses and wagon could travel influenced the design of the early branch line railroad network. This development pattern resulted in branch lines that were no farther apart than 10 to 20 miles, and even the most remote producing areas were accessible to rail transportation.

Development of the country grain merchandising system was also influenced by the limited distance a team of horses and wagon could travel, the relative density of the branch line network and technology available at that time. This resulted in a large number of country elevators spaced only a few miles apart on grain gathering rail lines. Although much of what existed in the past still exists today in the form of branch line network, economic and technological forces that influenced its development have changed since the turn of the century. Other factors are currently at work that may influence rationalization of the railroad network and the country grain merchandising system.

Factors which will influence the future grain handling, transportation, and merchandising system include branch line abandonment, implementation of

multiple car and unit train grain rates, and capital replacement decisions. Other factors include differing rates of cost increases in the two modes, thereby shifting their competitive relationship. Competition between producing regions will also influence the future system. Efficiencies gained as a result of changes in marketing systems by competing producing regions will possibly influence a move to obtain those same efficiencies by other producing regions. The changing technology of farm trucks and the improved quality of our highway system makes it possible for producers to move grain in the state's traditional grain merchandising system. Government policies such as railroad deregulation may have some impact on the system.

As a result of these impending changes that could alter a rather traditional grain handling, transportation, and merchandising system, many private and public decisions will have to be made. These include decisions regarding location, economic viability, size of plant, investment in grain facilities, investment in transportation equipment and infrastructure, efficiencies of merchandising, purchases of farm production equipment, and storage capacity. If such decisions are to be made on an informed basis, it is important that basic information about the industry be developed and published. It was for this reason that the Upper Great Plains Transportation Institute and the Department of Agricultural Economics of North Dakota State University have undertaken the "North Dakota Grain Handling, Transportation, and Merchandising Study." Cooperators in the study include: Burlington Northern Railroad, Farm Bureau, Farmers Union, Grain Terminal Association, North Dakota Agricultural Experiment Station, North Dakota Department of Agriculture, North Dakota State Highway Department, North Dakota Public Service Commission, St. Paul Bank for Cooperatives, and the Soo Line Railroad Company. The purpose of this study is to provide relevant information to

decision makers meeting the challenge of a changing business environment in handling, transportation, and merchandising grain in North Dakota.

The study is composed of a number of research projects that will result in 13 separate publications of which this is one. The publications planned for release at varied time intervals are:

-Description of the Existing Country Elevator System
-Cost Analysis of Existing Country and Farm Storage System
-Cost Analysis of Subterminal Elevators
-Existing and Past Patterns of North Dakota Grain Movements
-Description of Rail Rate Structure, Multiple Car Movements, and Rates and Analysis of Shipper-Owned Equipment
-Description and Analysis of Exempt Carrier Industry
-Economics of Branch Line Operation
-Farm Truck Costs
-Seasonal Behavior of Marketing Patterns for Grain from North Dakota
-Grain Merchandising
-Marketing Using Delayed Pricing Controls
-Analytical Model for Analyzing Economic Efficiencies of Subterminals
-North Dakota Grain Handling, Transportation, and Merchandising Study: Summary, Conclusions, and Policy Implications

These reports, as they are completed, will be available upon request from the Department of Agricultural Economics or the Upper Great Plains Transportation Institute, North Dakota State University.

AN ANALYSIS OF SHIPPER LEASED RAIL EQUIPMENT IN NORTH DAKOTA

by

Dennis R. Ming*

Grain is transported from North Dakota by two modes--rail and truck. Shippers typically acquire these transportation services through railroads and trucking firms. In the past, railroads and for-hire truckers have supplied both transportation equipment and labor. However, freight car shortages in the past have caused changes in this system--some major and some minor.

Grain shippers, particularly between 1975 and 1980, began to buy and lease transportation equipment in order to alleviate bottlenecks caused by rail car shortages. Leased rail equipment, particularly covered hopper cars, appears to have been the most popular leasing alternative. A survey by Griffin and Casavant in 1980 revealed the following facts about the grain elevator industry in North Dakota:[1] (1) tractor/trailer rigs were owned by 11 percent of the cooperative elevators and 22 percent of the private elevators; (2) tractor/trailer rigs were leased by 2 percent of the cooperatives and 3 percent of the privates; (3) three boxcars were owned by two elevators in 1975 compared to 13 elevators owning 56 boxcars in 1980; (4) one elevator owned four hopper cars in 1975, while 12 elevators owned 150 hopper cars in 1980; (5) two elevators leased 11 boxcars in 1975 compared to 49 elevators leasing 192 boxcars in 1980; and (6) 31 elevators leased 229

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[1]Griffin, Gene and Ken Casavant. Structure and Operating Characteristics of the North Dakota Grain Elevator Industry, Upper Great Plains Transportation Institute, North Dakota State University, Fargo, forthcoming.

hopper cars in 1975, while 175 elevators leased 1,540 hopper cars in 1980.[2] Consequently, leasing of covered hopper cars has been used extensively by country elevators in North Dakota.

While the use of privately owned equipment has resulted largely from past equipment shortages, surpluses existed throughout much of 1980 and 1981. Covered hopper car surpluses were roughly 5,000 cars per day the latter part of 1980 and 26,000 per day in 1981.[3] However, surpluses can turn into shortages rather quickly, given the volatile nature of the grain industry. Shortages of covered hopper cars have occurred in eight of the past 10 years according to the Association of American Railroads.[4] Consequently, elevator operators may be justified in their use of privately owned equipment in order to guarantee transportation services.

Objectives of Study

The main objective of this study is to examine the use of leased and privately owned covered hopper cars by grain elevators in North Dakota. Specific objectives are to:

1. Describe rail car leasing authority;
2. Evaluate the utilization of leased hopper cars; and
3. Compare the economics of leasing versus purchasing covered hopper cars.

Sources of Data

Data used in this study were obtained from a survey of grain elevator operators in North Dakota. In August 1981, a mail questionnaire (Appendix A)

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[2]In addition, two grain companies operating in North Dakota leased 2,000 hopper cars.

[3]Personal communication with Association of American Railroads, December 1981.

[4]Ibid.

was sent to 175 elevator operators identified as leasers of hopper cars in 1980.[5] These 175 elevator operators were identified as the entire population of those who leased hopper cars.

A second mailing was sent approximately three weeks after the first to nonrespondents and was followed by a third mailing in mid-September. A total of 50 questionnaires was returned (Table 1). Data gathered from the

TABLE 1. QUESTIONNAIRES RETURNED FROM FIRST, SECOND, AND THIRD MAILINGS, LEASED HOPPER CAR SURVEY, NORTH DAKOTA, 1981

Mailing	Questionnaires Sent	Questionnaires Returned
First	175	37
Second	138	10
Third	128	3
Total Returned		50

questionnaire were supplemented with grain movement data available at the Upper Great Plains Transportation Institute and North Dakota Public Service Commission.

Procedures and Methodology

Procedures used to analyze the data were primarily statistical in nature. Data on lease costs, covered hopper car characteristics, revenues earned, utilization, and market channels were examined. In addition, data pertaining to past, present, and future use of leased equipment by country elevator operators were analyzed.

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[5]Griffin and Casavant, op. cit.

Net present value analysis was used to compare various lease and purchase arrangements. Cash inflows and outflows were discounted for several lease and purchase options based on the theory that a dollar today is worth more than a dollar tomorrow.

Rail Car Leasing Authority

This section contains a description of the rail grain fleet and receiving use authority (OT-5) for privately owned rail equipment. The analysis will focus on covered hopper cars since they comprise most of the leased equipment in North Dakota.

Rail Grain Fleet

A significant increase in private ownership of covered hopper cars has occurred since 1970 (Table 2). Roughly 39,000 hopper cars were privately

TABLE 2. NUMBER OF PRIVATELY OWNED COVERED HOPPER CARS, VARIOUS YEARS

Year	Covered Hopper Cars
	(no. of cars)
1970	38,972
1975	70,029
1977	73,103
1979[a]	70,700
1980[a]	88,500
1981[a]	103,300

[a]Years are not comparable with previous years due to computer separation of jumbo and small covered hopper cars. For example, the total number of privately owned cars in 1979 was 98,643.

SOURCE: Association of American Railroads, Yearbook of Railroad Facts, various issues, and United States Department of Agriculture, Grain Transportation Situation, various issues.

owned in 1970 compared to 103,300 in 1981 in the United States. Private ownership of covered hopper cars has been increasing relative to railroad-owned covered hopper cars. For example, approximately 15 percent of the hopper car fleet was privately owned in 1973 compared to about 42 percent in 1981.[6] Consequently, private ownership of rail cars has become an increasingly important component of the total rail grain fleet.

Total carrying capacity of the rail grain fleet increased slightly in 1981 compared to 1978 (Table 3). Total capacity was 678.5 million bushels in 1978 compared to 829 million bushels in 1981. Boxcar numbers decreased from 86,500 in 1978 to 43,800 in 1981 while jumbo hopper car numbers increased from 148,700 in 1978 to 218,100 in 1981. Consequently, technological advances have caused a shift in the type and capacity of equipment being used on rail lines.

The shift in equipment usage by the railroads is reflected in the heavy use of covered hopper cars for recent grain movements. The percentage of rail-moved grain shipped in covered hopper cars increased from 51 percent in 1970 to 90 percent in 1980 (Table 4). While the number of loads moved by covered hopper cars has not increased significantly from 1970 to 1980 (about 2 percent), the proportion of all loads moved by covered hopper cars has increased from 38 to 84 percent during this same period. Covered hopper cars are also increasing in size as well as usage. For example, average capacity per car increased from 86.8 tons in 1970 to 95.7 tons in 1981 (Table 3).

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[6]Personal communication with Association of American Railroads, December 1981.

TABLE 3. NUMBER OF BOXCARS, COVERED HOPPER CARS, AVERAGE CAPACITIES AND TOTAL CAPACITY, UNITED STATES, 1970-1981

Year	Boxcars (40' Narrow Door)			Hopper Cars			Total Boxcar and Hopper Capacity
	Number	Average Capacity	Total Capacity	Number	Average Capacity	Total Capacity	
	(000)	(tons/car)	(million bu.)	(000)	(tons/car)	(million bu.)	(million bu.)
1970	180.0	54.6	361.8	161.1	86.8	547.6	909.4
1971	207.6[a]	54.9	415.2	170.7	88.2	580.7	995.9
1972	190.0	56.6	380.1	179.9	88.6	611.6	991.7
1973	178.5	57.5	357.0	186.2	88.2	633.2	990.2
1974	164.7	59.0	329.3	204.9	89.9	696.8	1,026.1
1975	149.5	59.0	299.0	219.4	91.3	745.9	1,044.9
1976	131.6	60.9	263.3	228.3	91.3	876.1	1,039.4
1977	107.8	62.4	215.5	230.1	92.3	782.2	997.7
1978[b]	86.5	62.8	172.9	148.7	92.9	505.6	678.5
1979[b]	66.2	62.4	132.4	161.8	94.3	550.0	682.4
1980[b]	58.5	62.5[c]	117.0	186.0	94.9[c]	632.3	749.3
1981[b]	43.8	62.5[c]	87.5	218.1	95.7[c]	741.5	829.0

[a]Increase due to reclassification of several cars from narrow door to wide door.
[b]Figures for 1978-81 are not comparable to previous years due to computer separation of small and jumbo covered hopper cars.
[c]Estimates.

SOURCE: Association of American Railroads, Statistics of Railroads of Class I, Nov. 1980, and USDA, Grain Transportation Situation, Nov. 16, 1981.

TABLE 4. MOVEMENT OF GRAIN BY BOXCARS AND COVERED HOPPER CARS, 1970-80

Year	Total Rail Volume	Covered Hopper Cars			Box Cars		
		Number of Loads	Percent of Loads	Percent of Volume	Number of Loads	Percent of Loads	Percent of Volume
	(000,000 bu.)	(000 loads)			(000 loads)		
1970	3,702	1,463	38	51	908	62	49
1971	3,390	1,288	45	58	707	55	42
1972	3,697	1,356	52	65	653	48	35
1973	4,501	1,678	49	62	852	51	38
1974	4,210	1,463	63	74	546	37	26
1975	4,065	1,342	74	83	355	26	17
1976	4,100	1,322	79	86	282	21	14
1977	3,911	1,249	81	88	239	19	12
1978	4,125	1,340	77	85	309	23	15
1979	4,410	1,425	78	86	311	22	14
1980	5,004	1,575	84	90	252	16	10

SOURCE: Association of American Railroads, The Grain Book, Office of Information and Public Affairs, Washington, D.C., 1981.

OT-5 Authority

Essentially, OT-5 authority allows shippers to provide privately owned equipment and railroads to transport the equipment.[7] Under OT-5, railroads

[7]The designation "OT-5" is derived from Association of American Railroads, Circular No. OT-5-E, Operations and Maintenance Department, Operation Transportation Division, Washington, D.C., April 1981. Essentially, OT-5 is the process of obtaining reporting marks and use authority for private cars used on system lines. Item 605 of Tariff PHJ-6007-G actually outlines mileage allowances and rules governing the handling of and the payment of mileage credits for privately owned cars.

have the discretion to allow nonrailroad-owned equipment or to disallow it. In the past, most railroads have allowed OT-5 authority--primarily as a direct result of severe freight car shortages during the 1970s. However, the recent buildup of the jumbo hopper car fleet, coupled with increased utilization of equipment, has resulted in railroads including conditions to OT-5. Such conditions may include agreements whereby shippers are required to ship a given number of railroad-owned cars for every privately owned car shipped. One railroad once required shippers to ship 16 railroad-owned cars for each privately owned car shipped. Most conditions, however, are not that extreme, with a one-for-one basis being fairly common during periods of surplus.

Shippers who provide privately owned hopper cars are entitled to compensation from the railroads. This compensation is usually in the form of mileage payments which are published in a national mileage allowance tariff, Mileage Tariff PHJ-6007-G. These mileage credits are subject to constant revision and have increased substantially since OT-5 was first implemented. Mileage credits from October 1, 1979, are presented in Table 5, while more

TABLE 5. ALLOWANCES FOR PRIVATELY OWNED HOPPER CARS, 1981

Value of Car[a]	Mileage Allowance
up to $4,999	14.6¢
5,000 to 9,999	16.4
10,000 to 14,999	19.0
15,000 to 19,999	21.0
20,000 and up	24.0

[a]Pertains to cars less than 30 years old. Cars older than 30 years received mileage credits of 11 cents per loaded mile.

SOURCE: Interstate Commerce Commission, Mileage Tariff PHJ-6007-G, October 1, 1979.

recent alllowances for privately owned hopper cars are shown in Table 6. These mileage credits apply to single car shipments.

Not all shippers receive the actual mileage credits as they appear in the tariff. Some railroads offer reduced rates for commodities shipped in privately owned cars and/or allow lower or no mileage credits depending on the amplitude of the rate reduction. For example, one railroad offered a "capped" rate, regardless of car age, of a given rate per loaded mile and, in turn, guaranteed a fixed turnaround time. Consequently, shippers were receiving lower per mile mileage credits but may have been realizing a higher return due to increased utilization.

Multiple Car Shipments

Mileage allowances paid to lessees using multiple-car shipments differ compared to single car allowances. For example, the maximum mileage credit allowed during 1981 was 39.45 cents per loaded mile for single car shipments and 24 cents per loaded mile for multiple-car and unit train grain shipments. While the mileage credit for multiple-car shipments may be substantially lower than the single-car allowance, rate reductions for multiple-car shipments may more than offset the differential.

Supplement 46 to Tariff PHJ-6007-G Rates

Based on Supplement 46 rates, a schedule was developed indicating generated revenues for privately owned hopper cars (Table 7).[8] For example, a hopper car travelling 600 loaded miles per month and earning 35.35 cents per

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[8]Interstate Commerce Commission, Mileage Allowances and Rules Governing the Handling of and the Payment of Mileage, Supplement 46 to Mileage Tariff PHJ-6007-G, Issued: September 29, 1981.

TABLE 6. MILEAGE ALLOWANCES FOR PRIVATELY OWNED HOPPER CARS, 1981

Value of Car	Age of Car (Years) 1-29	30 and Over
($)	------cents per loaded mile-----	
Less than 1000	10.06	9.68
1001 - 2000	10.90	9.76
2001 - 3000	11.74	9.84
3001 - 4000	12.58	9.92
4001 - 5000	13.42	9.99
5001 - 6000	14.26	10.07
6001 - 7000	15.10	10.15
7001 - 8000	15.94	10.23
8001 - 9000	16.78	10.30
9001 - 10000	17.62	10.38
10001 - 11000	18.46	10.46
11001 - 12000	19.30	10.53
12001 - 13000	20.14	10.61
13001 - 14000	20.98	10.69
14001 - 15000	21.82	10.77
15001 - 16000	22.66	10.84
16001 - 17000	23.50	10.92
17001 - 18000	24.34	11.00
18001 - 19000	25.18	11.08
19001 - 20000	26.02	11.15
20001 - 21000	26.86	11.23
21001 - 22000	27.69	11.31
22001 - 23000	28.53	11.39
23001 - 24000	29.37	11.46
24001 - 25000	30.21	11.54
25001 - 26000	31.05	11.62
26001 - 27000	31.89	11.70
27001 - 28000	32.73	11.77
28001 - 29000	33.57	11.85
29001 - 30000	34.41	11.93
30001 - 31000	35.25	12.01
31001 - 32000	36.09	12.08
32001 - 33000	36.93	12.16
33001 - 34000	37.77	12.24
34001 - 35000	38.61	12.31
35001 and over	39.45	12.39

SOURCE: Interstate Commerce Commission, Mileage Allowances and Rules Governing the Handling of and the Payment of Mileage, Supplement 46 to Mileage Tariff PHJ-6007-G, Issued: September 29, 1981.

TABLE 7. GENERATED REVENUES FOR PRIVATELY OWNED HOPPER CARS BY LOADED MILEAGE, BASED ON SUPPLEMENT 46 TO TARIFF PHJ-6007-G RATES.

Cents Per Loaded Mile	Loaded Miles									
	100	200	300	400	500	600	700	800	900	1000
	Dollars									
18.46	18.46	36.92	55.38	73.84	92.30	110.76	129.22	147.68	166.14	184.60
19.30	19.30	38.60	57.90	77.20	96.50	115.80	135.00	154.40	173.70	193.00
20.14	20.14	40.28	60.42	80.56	100.70	120.84	140.99	161.12	181.26	201.40
20.98	20.98	41.96	62.94	83.92	104.90	125.88	146.86	167.84	188.82	209.80
21.82	21.82	43.64	65.46	87.28	109.10	130.92	152.74	174.56	196.38	218.20
22.66	22.66	45.32	67.98	90.64	113.30	135.96	158.62	181.28	203.94	226.60
23.50	23.50	47.00	70.50	94.00	117.50	141.00	164.50	188.00	211.50	235.00
24.34	24.34	48.68	73.02	97.36	121.70	146.04	170.38	194.72	219.06	243.40
25.18	25.18	50.36	75.54	100.72	125.90	151.08	176.26	201.44	226.62	251.80
26.02	26.02	52.04	78.06	104.08	130.10	156.12	182.14	208.16	234.18	260.20
26.86	26.86	53.72	80.58	107.44	134.30	161.16	188.02	214.88	241.74	268.60
27.69	27.69	55.38	83.07	110.76	138.45	166.14	193.83	221.52	249.21	276.90
28.53	28.53	57.06	85.59	114.12	142.65	171.18	199.71	228.24	256.77	285.30
29.37	29.37	58.74	88.11	117.48	146.85	176.22	205.59	234.96	264.33	293.70
30.21	30.21	60.42	90.63	120.84	151.05	181.26	211.47	241.68	271.89	302.10
31.05	31.05	62.10	93.15	124.20	155.25	186.30	217.35	248.40	279.45	310.50
31.89	31.89	63.78	95.67	127.56	159.45	191.34	223.23	255.12	287.01	318.90
32.73	32.73	65.46	98.19	130.92	163.65	196.38	229.11	261.84	294.46	327.30
33.57	33.57	67.14	100.71	134.28	167.85	201.42	234.99	268.56	302.13	335.70
34.41	34.41	68.82	103.23	137.64	172.05	206.46	240.87	275.28	309.69	344.10
35.25	35.25	70.50	105.75	141.00	176.25	211.50	246.75	282.00	317.25	352.50
36.09	36.09	72.18	108.27	144.36	180.45	216.54	252.63	288.72	324.81	360.90
36.93	36.93	73.86	110.79	147.72	184.65	221.58	258.51	295.44	332.37	369.30
37.77	37.77	75.54	113.31	151.08	188.85	226.62	264.39	302.16	339.93	377.70
38.61	38.61	77.22	115.83	154.44	193.05	231.66	270.27	308.88	347.49	386.10
39.45	39.45	78.90	118.35	157.80	197.25	236.70	276.15	315.60	355.05	394.50

loaded mile would generate $211.50 in revenues (from column "600" and row "35.25"). Lessees paying $440 per month to lease hopper cars, therefore, would have a net lease payment of $228.50 ($440-$211.50) for that month.

Reporting Marks

Item 605-B of Mileage Tariff PHJ-6007-G contains regulations under which shippers may obtain reporting marks (used to identify the owner or lessee) for privately owned cars. Mileage allowances are paid only to the person or company to whom the reporting marks are assigned.

While PHJ-6007-G mostly outlines the procedures for mileage payments, etc., Circular No. OT-5-E outlines "rules governing assignments of reporting marks and mechanical designations."[9] Once a shipper obtains reporting marks pursuant to Circular No. OT-5-E, he is then eligible to receive mileage credits under the provisions of Item 605, Mileage Tariff PHJ-6007-G (supplemented versions).

Types of Leases

Several lease arrangements are available to lessees in acquiring rail freight cars. Among the most common are: (1) full payout net lease; (2) net operating lease; (3) full service full payout; and (4) full service operating lease.

Full Payout Net Lease

A full payout net lease is a long term lease under which the lessee has use of the equipment for most of the equipment's useful life. The lessee assumes nonfinancial ownership costs during the term of the lease, which

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[9]Interstate Commerce Commission, The Official Railway Equipment Register, Circular No. OT-5-E, ICC RER 6410-J, July 1981, p. 1510.

include such things as maintenance, property taxes, insurance, administration, and so on.

Net Operating Lease

The net operating lease is a relatively short term lease. As in the full payout net lease, the lessee is responsible for ownership costs. Consequently, this type of lease is not popular for equipment with a long expected life, such as covered hopper cars, unless the lessor is reasonably confident of future leases.

Full Service Full Payment Lease

Under this type of lease agreement, all acquisition costs, nonfinancial ownership costs and a profit are returned to the lessor. The lease is a long term lease and is usually used by lessees who prefer not to assume management responsibilities for the equipment but want the equipment for most of its useful life.

Full Service Operating Lease

The full service operating lease is the option that is most commonly used by country elevators in North Dakota for leasing covered hopper cars. Lessees have use of the equipment for a term that is relatively shorter than the useful life of the hopper car. Lessors remain responsible for maintenance and ownership costs, while lessees are responsible for lease payments as stated in the agreement. These payments normally include a given payment per month as the basic lease cost. Frequently, a high utilization charge is assessed should the hopper car be utilized extensively during any one year.

SCOT-5

The use of privately owned freight cars on railway lines has been subject to much debate. Some railroads felt that they should have been allowed to realize full "utilization" on railroad-owned cars before shippers were permitted to use private cars. The biggest controversy existed with respect to covered hopper cars--those normally used for transporting grain. There was no debate on this issue for tank cars since shippers were "normally" expected to use private tank cars for shipping their products. Shippers, on the other hand, contended that they were not being allowed to realize an adequate return on investment during times of surplus. In other words, their privately owned hopper car fleet was being underutilized when surpluses of rail equipment existed.

While shippers were fighting to keep privately owned cars on raillines, some railroads were limiting or stopping new OT-5 authority. Sante Fe Railroad, for example, once stopped granting OT-5 authority altogether and proposed not to load privately owned hopper cars after May 1, 1982.[10] They have since rescinded their position on this issue; however, certain implications are apparent. Some railroads may allow shipper-owned equipment on their lines while others may oppose it. Santa Fe also has devised a plan to either purchase privately owned cars or take over existing leases on leased cars in an attempt to eliminate leased or privately owned hopper cars from its rail lines.

Currently, neither of the two major railroads serving North Dakota shippers, Burlington Northern nor the Soo Line, has taken such a drastic

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[10]Railway Age, Santa Fe and the OT-5 Controversy, June 29, 1981, pp. 20-30.

stand. Some shippers have entered into "verbal" agreements whereby the railroad will ship one private car for every system car that is shipped.[11] Other shippers are still allowed to ship private cars as need allows.

The issue involving private hopper cars entails arriving at an equitable solution for their use during alternating periods of shortage and surplus. The period that is most critical is when grain cars are in excess supply and both railroads and shippers feel their respective cars are being underutilized.

Description of SCOT-5[12]

Shippers committee, OT-5 (SCOT-5), is a voluntary association of shippers, manufacturing companies, leasing companies, and car management companies who have an economic interest in covered hopper cars. SCOT-5 was organized in response to the Interstate Commerce Commission's (ICC) decision in Ex Parte No. 334, Car Service Compensation--Basic Per Diem Charges--Formula Revision in Accordance with the Railroad Revitalization and Regulatory Reform Act of 1976, 358 ICC 715 (1977). Some shippers, during the proceeding, complained that OT-5 was being used unjustly by certain railroads and mileage allowances were not being paid at proper levels. The intent of SCOT-5 was to influence the ICC into having a rule-making proceeding for the purpose of reviewing OT-5 agreements. Generally, it was the position of members of SCOT-5 that shippers be allowed to utilize privately owned equipment free of conditions imposed by carriers. For example, some carriers were requiring

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[11]Private communications with railroad personnel and elevator operators.

[12]The following description of SCOT-5 was taken primarily from Goldstein, Andrew P., Docket No. 38692 presented before the Interstate Commerce Commission, August 21, 1981.

shippers to reduce their fleet of private cars prior to receiving OT-5 authority while others were denying OT-5 altogether.

Members of SCOT-5 requested rules that fell into two basic categories.

(1) "Rules 1 and 2 called for a complete and unqualified end to railroad regulation of private covered hopper cars, except with respect to mechanical and safety qualifications of cars."

(2) "Rules 3, 4, 5, and 6 presented an alternative solution and suggested the possibility of a 'sharing formula' covering the placement of carrier and private cars during times of car surplus."

Basically, SCOT-5 members intended to impede carriers from adopting rules or practices, or publishing tariffs which prohibited or limited the use and loading of private cars by shippers. It was their position that basic OT-5 restrictions on the use of private covered hopper cars be rescinded. A major impetus behind SCOT-5's position was Rule 37 of the Uniform Freight Classification Tariff, ICC UFC 6000-A, which stated in part:

> "...rating or rates provided for freight in bulk in covered hopper cars do not obligate the carriers to furnish covered hopper cars."

Consequently, SCOT-5 members contended that while carriers were required to furnish boxcars, they were not required to furnish hopper cars, hence privately owned cars should have been permitted on rail lines without restrictions.

The ICC denied SCOT-5's request for a rule-making proceeding in December 1981. Basically, the ICC contended that ruling in favor of SCOT-5 would profit car builders, lessors, and some private car owners at the expense of railroads and shippers. It was the ICC's contention that approval of the rule-making request would be in direct contradiction with the Staggers Rail Act of 1980, an act that was meant to assist railroads in improving revenues.

Leased Equipment in North Dakota

This section contains a description of leasing agreements and utilization of equipment for country elevators in North Dakota. Only data on leased hopper cars were analyzed since this represented the most prevelant use of shipper-owned equipment in the state. Utilization factors analyzed pertained to car cycles. Simple statistics on number of cars, lease costs, etc., are also presented.

Survey Results

As was pointed out in earlier sections, country elevator operators utilized shipper-owned equipment for various reasons. Probably the most significant factor was to insure equipment availability. Leasing covered hopper cars is not a money-making strategy in terms of mileage allowances earned. That is, lessees generally do not earn mileage credits in excess of lease payments. However, it may be a profit-maximizing strategy in that country elevator operators have more flexibility in marketing grain when supplies of transportation equipment are short. Consequently, operators who lease equipment may have an advantage in marketing grain by rail, during times of shortage, over those who do not lease.

Lease Agreements

Lease agreements vary from lessor to lessor and from lessee to lessee. However, all are similar in that they contain the essential terms to a contract such as identity of parties, duration, quantity, and price. These terms may be specified in either the body of the agreement or in the attachments or riders.

Appendix B contains an example of an application for authority to place privately owned freight cars (other than tank cars) in service under the

provisions of AAR Circular OT-5-E Series and a car leasing agreement. The contract covers such things as use of the cars, delivery, terms of payment, acceptance of cars, record keeping, repairs, modifications, taxes, etc. Specifics such as number of cars, size of cars, age of cars, length of lease, lease amount and other charges would be listed on additional riders (not shown).

Survey results indicated that the mean number of covered hopper cars leased by country elevators was seven (Table 8). The smallest number of hopper

TABLE 8. MEAN LEASED HOPPER CAR NUMBERS, LEASE COST, AGE OF CARS, LENGTH OF LEASES, MILEAGE ALLOWANCES AND CAR SIZES, NORTH DAKOTA COUNTRY ELEVATORS, 1981

Variable	Sample Size	Minimum Value	Maximum Value	Mean Value
Number of Cars	50	2	23	6.96
Lease Cost ($/mo.)	49	195	550	430
Age of Car (yrs.)	46	1	15	4.03
Length of Lease (yrs.)	47	1	15	4.99
Mileage Allowance (¢/loaded mi.)	45	17.39	26.70	24.50
Car Size (Cu. Ft.)	48	3500	4750	4700

cars leased was two while the most was 23. Based on jumbo hopper car capacities of 3,300 bushels and average turnaround times of 15 days to various Minnesota destinations, the "average" elevator manager would have capabilities to ship roughly 46,000 bushels of wheat per month by leased equipment. The country elevator operator leasing the most cars (23) has the capacity to ship approximately 150,000 bushels of grain per month, based on respective car capacities and turnaround times.

Basic lease costs varied from $195 to $550 per month with the mean being $430 per month. Lower lease payments, generally, were for leases

entered into around 1975-76, while higher lease payments were for later years. Lease agreements for new jumbo hopper cars could be negotiated for about $375 per month during the latter part of 1981. Consequently, the current surplus of rail equipment has resulted in lower lease costs compared to the mean being paid by elevator managers responding to the survey.

Most cars that were leased were 4,750-cubic feet or 100-ton capacity hopper cars. Lease payments for these cars ranged from $225 per month to $550 per month. The elevator manager who was paying $225 per month per car in lease payments leased 10 cars with an average age of eight years and had a 15-year lease term. The elevator manager who was paying $550 per month per car leased two cars with an average age of three years and had a seven-year lease term. The $225 lease term was negotiated prior to the $550 lease term. Number of leased cars, ages of leased cars, leased and total rail car supply/demand situation, and length of lease are all important factors to consider when negotiating leases, according to car leasing company officials.

Only two lease agreements were for small covered hopper cars as reported by survey respondents. One respondent indicated leasing 3,500-cubic foot capacity cars for $195 per month while another reported leasing 10 3,700 cubic foot capacity cars for $323 per month. Both elevators were located on branch lines and may not have been able to ship large hopper cars on their lines.

Mileage allowances ranged from 17.39 cents per loaded mile to 26.70 cents per loaded mile. Mileage credits differed discriminately between respondents because the timing of the survey (August and September 1981) conflicted with tariff revisions. For example, the highest mileage credit paid was 24 cents per loaded mile when the first surveys were returned. However, Mileage Tariff PHJ-6007-G had been further revised between the time

the first questionnaires were sent and the later ones returned. Consequently, some respondents reported earning higher mileage credits than would have been reported had they responded sooner.

Mileage credits are commensurate with value of the car, as was pointed out in an earlier section.[13] Also, car values decline with age because of depreciation, so older cars tend to earn lower mileage credits than newer cars, other things equal. The elevator operator who reported earning 17.39 cents per loaded mile indicated that the average age of the cars was 15 years. Most elevator operators leased hopper cars that were relatively newer, which was reflected in higher mileage credits of 24 cents and 25.99 cents per loaded mile.

Volume of Grain Shipments

Elevator managers were asked to estimate the relative volumes of grains moved by leased hopper cars. These estimates were expressed in terms of percentages of total rail shipments (Table 9). About 44 percent of wheat,

TABLE 9. ESTIMATED PERCENTAGES OF TOTAL RAIL SHIPMENTS BY LEASED HOPPER CAR, NORTH DAKOTA COUNTRY ELEVATORS, 1981

Commodity	Sample Size	Leased Hopper Car Shipments by Survey Respondents as a Percent of Total Rail Shipments
Wheat	44	44
Durum	35	45
Barley	32	44
Sunflower	24	29

durum, and barley rail shipments by survey respondents were transported by leased hopper cars, while 29 percent of the sunflower was moved in leased

[13]Many factors affect the value of a hopper car other than age. For example, both car size and modifications positively affect value.

equipment. Consequently, elevator managers responding to the survey moved a considerable portion of their grain to market in leased hopper cars.

Estimated percentages of grain, by commodity, moved by leased hopper cars (from Table 9) were multiplied by total rail shipments to obtain volumes of grain moved in leased equipment (Table 10). Average volumes of wheat,

TABLE 10. AVERAGE VOLUME OF GRAIN SHIPMENTS BY TYPE OF SHIPMENT AND COMMODITY, LEASED HOPPER CAR SURVEY RESPONDENTS, 1981

Type of Shipment	Wheat	Durum	Barley	Sunflower
Rail (bu.)	306,964	58,826	113,865	101,877
Truck (bu.)	36,513	19,356	36,297	3,512
Total (bu.)	343,477	78,182	150,162	105,389
Hopper Car (bu.)	277,077	52,558	102,927	94,107
Leased Hopper Car (bu.)	135,064	26,472	50,101	29,545
LHC/Total (Pct.)[a]	40	34	34	29
LHC/Hopper Car (Pct.)[a]	49	51	49	32

[a]LHC = Leased Hopper Car.

SOURCE: Rail, truck, total, and hopper car volumes are from North Dakota Public Service Commission, Unpublished Grain Movement Data, 1980-81.

barley, sunflower, and durum shipped in leased hopper cars were 135,064, 50,101, 29,545, and 26,472 bushels per elevator, respectively. About 8-10 percent of North Dakota's total grain and oilseed movement was shipped to market in leased hopper cars in 1980-81, if it is assumed that the survey respondents were representative of the country elevator population.

Market Outlets

It was hypothesized that many lessees may have specific market channels for grain shipped in leased equipment. However, only seven elevator managers indicated specific market outlets for leased hopper car shipments. Two elevator managers indicated that leased hopper car shipments moved exclusively

to Pacific Northwest destinations (Table 11). Other respondents indicated that leased hopper car shipments went to Duluth/Superior, Minneapolis/St. Paul and Pacific Northwest destinations, while one indicated shipments were to various malting barley outlets.

TABLE 11. MARKET OUTLETS FOR LEASED HOPPER CAR SHIPMENTS, NORTH DAKOTA COUNTRY ELEVATORS, 1981

Respondent	Destinations of Leased Hopper Car Shipments[a]
A	DS, MSP
B	DS, MSP, PNW
C	PNW
D	MSP, PNW
E	PNW
F	DS, MSP
G	MBO
Remaining 43 Respondents	DS, MSP, PNW, and/or others

[a]DS = Duluth/Superior, MSP = Minneapolis/St. Paul, PNW = Pacific Northwest, MBO = Malting Barley Outlets.

Freight Car Utilization

An optimum sized freight car fleet can be defined as one in which the prospective rate of return to the railroad as a whole on the last car acquired is just equal to the cost of capital.[14] The marginal revenue gained from adding the last freight car to the fleet must equal the marginal cost of the car.

In the case of the grain industry, the optimum-size grain car fleet as a whole may be difficult to quantify due to the volatile nature of the industry. The demand for grain cars is largely dependent on the price of grain. That is, until producers market their grain, transportation services

[14]Felton, John Richard, The Economics of Freight Car Supply, University of Nebraska Press, 1978, p. 59.

will not be required; it is a derived demand. Consequently, car shortages and surpluses tend to occur during times of high prices and low prices, respectively. Therefore, railroads and private rail car owners are faced with a difficult task in determining the optimum number of freight cars to supply for grain shipments.

Several factors which influence the quantity of grain transported by railroads may be identified. Among these are: (1) availability of grain cars; (2) utilization of equipment; (3) intermodal competition; (4) quantity of grain to be marketed; and (5) miscellaneous factors. In addition, efficiency in freight car use can be a function of various factors: (1) percentage of fleet in serviceable condition; (3) percentage of capacity utilized; (3) ratio of loaded to empty miles; (4) portion of the day which cars spend in road trains; (5) train speed; and (6) miscellansous factors. The intent of this study is to focus on utilization of equipment in terms of car cycles.[15] Actual car cycles for leased hopper cars will be compared to calculated estimates based on analytical procedures developed by the United States Railway Association.[16]

Car Cycles

While rail car fleet adequacy is a difficulty to quantify, car cycles are a good indication of utilization of existing equipment. Elevator operators were asked to estimate turnaround times to various destinations for leased cars. Turnaround times to Duluth/Superior and Minneapolis/St. Paul

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[15]A car cycle shall be defined as the time it takes to transport a hopper car from the elevator to the unloading site and return to the elevator.

[16]Times spent on branch lines were taken from United States Railway Association, Viability of Light-Density Rail Lines, March 1976.

averaged 15.1 and 16.1 days, respectively, while the average turnaround time to the Pacific Northwest was 24.1 days (Table 12). Car cycle times averaged 19.2 days to "other" destinations.

TABLE 12. CAR CYCLE TIMES FROM COUNTRY ELEVATOR POINTS TO VARIOUS DESTINATIONS FOR LEASED HOPPER CARS, NORTH DAKOTA, 1981

Destination	Sample Size	Minimum Value	Maximum Value	Mean Value
		-------number of car days----------		
Duluth/Superior	48	9	25	15.1
Minneapolis/St. Paul	20	11	30	16.1
Pacific Northwest	25	14	42	24.1
Other	10	8	42	19.2

Various monthly revenues were calculated based on alternative car cycle times and loaded mileage (Table 13). A mileage credit of 24 cents per loaded mile was used since that was the maximum allowance paid by railroads for use of privately owned hopper cars during 1981 for multiple car shipments. As can be seen in Table 13, car cycle times are critical in the potential revenue generation of leased hopper cars. As car cycle times decrease (increase) loaded mileages and revenues increase (decrease) accordingly, *ceteris paribus*. For example, a 2,800-mile multiple car movement (1,400 loaded miles) taking 24 days to complete would generate $420 per car in revenue on a monthly basis. Revenues would be $336 per car for that particular movement (1,400 loaded miles times 24 cents per loaded mile) plus one-fourth of the next movement occuring during that same month or $84 ($\frac{1400}{4}$ * 24¢). Generated revenues were calculated assuming no inactive car days for loading, etc. A car cycle time of 30 days would result in monthly revenues decreasing from $420 to $336. Conversely, a decrease in car cycle time to 16 days would yield monthly revenues of $630. Consequently, potential revenues for privately owned hopper

TABLE 13. GENERATED REVENUES FOR PRIVATELY OWNED JUMBO HOPPER CARS, BASED ON TWENTY-FOUR CENTS PER LOADED MILE ALLOWANCE AND ALTERNATIVE CAR CYCLE TIMES AND LOADED MILEAGE, MONTHLY BASIS

One Way Loaded Miles	Car Cycle Times (Days)										
	10	12	14	16	18	20	22	24	26	28	30
	Dollars										
100	72	60	51	45	40	36	33	30	28	26	24
200	144	120	103	90	80	72	65	60	55	51	48
300	216	180	154	135	120	108	98	90	83	77	72
400	280	240	206	180	160	144	131	120	111	103	96
500	360	300	257	225	200	180	164	150	138	129	120
600	432	360	309	270	240	216	196	180	166	154	144
700	504	420	360	315	280	252	229	210	914	180	168
800	576	480	411	360	320	288	262	240	222	206	192
900	648	540	463	405	360	324	295	270	249	231	216
1,000	720	600	514	450	400	360	327	300	277	257	240
1,100	792	660	566	495	440	396	360	330	305	283	264
1,200	864	720	617	540	480	432	393	360	332	309	288
1,300	936	780	669	585	520	468	425	390	360	334	312
1,400	1008	840	720	630	560	504	458	420	388	360	336
1,500	1080	900	771	675	600	540	491	450	415	386	360

cars are a function car cycle times, loaded mileage and the mileage allowance paid by the railroads.

Optimum Car Cycles

Since roughly four-fifths of total interstate grain and oilseed shipments originating in North Dakota have been to Duluth/Superior, Minneapolis/St. Paul, and Pacific Northwest destinations in the past, the remainder of this section will focus on car cycles to these terminal and port areas. Economic-engineering data were used to compare "optimum" car cycle times with mean values reported by elevator managers.

Optimum car cycle times were developed using estimated times (car days) freight cars spend on-branch and off-branch. On-branch times were calculated

using data developed by United States Railway Association (Appendix C).[17] One-way mileages from the various origins to the various destinations were based on mean mileages of the sample. These mileages were approximately 400 miles for eastbound movements and 1,500 miles for westbound movements.

Car days spent on-branch were estimated for three scenarios:[18] (1) service on demand; (2) service three times per week; and (3) service twice per week (Table 14). Car days spent on branch lines were calculated to be 4.0, 6.4, and 8.3 for service on demand, service three times per week, and service twice per week, respectively.

TABLE 14. CAR DAYS SPENT ON-BRANCH

Variable	Frequency of Service		
	On Demand	3 times/wk.	2 times/wk.
	----------number of days----------		
Time spent at junction	0	.7	1.3
Time from junction to branch line point	1	1	1
Days loading at branch line point	2	2	2
Days at branch line point	0	1.7	3
Days from branch line point to junction	1	1	1
Total Car Days	4.0	6.4	8.3

SOURCE: United States Railway Association, Viability of Light-Density Rail Lines, March 1976.

Car days spent on the off-branch portion of a branch/mainline movement were calculated based on switching time, running time, unloading time, and

[17] Ibid.

[18] Ibid.

destination (Table 15). Car days for the off-branch portion of a movement were calculated to be 6.5 days for Duluth/Superior and Minneapolis/St. Paul movements and 11.5 and 15.5 days, respectively, for priority train and slow train movements to Pacific Northwest destinations.

TABLE 15. CAR DAYS SPENT OFF-BRANCH FOR MOVEMENTS TO DULUTH/SUPERIOR, MINNEAPOLIS/ST. PAUL, AND PACIFIC NORTHWEST AND RETURN

Variable	Duluth/ Superior	Minneapolis/ St. Paul	Pacific Northwest	
			Priority Train	Slow Train
	number of days			
Intermediate Switch[a]	2	2	---	4.0
Terminal Switch	1.0	1.0	1.0	1.0
Running Time	1.5[b]	1.5[b]	5.5[c]	5.5[c]
Unloading Time	2.0	2.0	2.0	2.0
Port Congestion	---	---	3.0	3.0
Total Car Days	6.5	6.5	11.5	15.5

[a]Assumes origins beyond regional switching limits.
[b]Based on 800 miles, round trip, divided by train speed of 22.6 miles per hour.
[c]Based on 3,000 miles, round trip, divided by train speed of 22.6 miles per hour.

Based on the car-day calculations, a branch/mainline movement east would be 10.5 days (4 days from Table 14 plus 6.5 days from Table 15), assuming service on demand for the branch line. A branch/mainline movement west (also assuming branch line service on demand) would be 15.5 days for a priority train (4 + 11.5) and 19.5 days for a slow train (4 + 15.5).

Besides external factors such as weather, car days spent on-branch or off-branch depends on frequency of service (branch lines) and short line miles (main lines). Consequently, car days decrease (increase) as frequency of service increases (decreases) and/or short line miles decrease (increase). For example, as frequency of service increases from two to three times per week, days

spent at branch line point decreases from 3.0 to 1.7 days (Table 14). Similarly, for each 50-mile increase (one way) in short line miles, the number of car days increases by approximately four and one-half hours.[19]

Car cycle times based on economic-engineering data varied considerably based on the type and direction of movement (Table 16). For example, an eastbound main line movement required 8.5 car days,[20] while an eastbound branch line movement, with rail branch service twice per week, required 14.8 car days. Car cycles for westbound movements were dependent on type of movement and type of train.

TABLE 16. CAR CYCLE TIMES BASED ON MAIN AND BRANCH LINE MOVEMENTS, ECONOMIC-ENGINEERING ESTIMATES, 1981

Type of Movement	Direction of Movement		
	East[b]	West[a]	
		Priority	Slow
	number of car days		
Main Line[c]	8.5	13.5	17.5
Branch Line[d]	10.5	15.5	19.5
Branch Line[e]	12.9	17.9	21.9
Branch Line[f]	14.8	19.8	23.8

[a]Based on 1500 mile (one-way) movement to Pacific Northwest destination.
[b]Based on 400 mile (one-way) movement to Minnesota destinations.
[c]Calculated by adding two days for loading to the number of car days spent off branch for combination branch/main line movements (Table 15).
[d]Service on demand.
[e]Service three times per week.
[f]Service twice per week.

[19]Based on SLM*2 ÷ Average Train Speed (50*2 ÷ 22.6 = 4.42). Where: SLM = Short Line Miles, Average Train Speed = 22.6 mph.

[20]Car days for a main line movement was calculated using car days spent off branch for a branch/main line movement and adding two days for loading time (6.5 + 2 = 8.5 days).

Survey results indicated that turnaround times were roughly 15 and 24 days for eastbound and westbound movements, respectively (Table 16). Average car cycle times reported by elevator managers were about equal to the highest economic-engineering estimates--14.8 car days for eastbound movements and 23.8 days for westbound movements. Consequently, utilization of leased hopper cars, in terms of car cycles, appears to be adequate and closely approximates utilization of railroad-owned equipment.

Lessor and Carrier Service

Country elevator managers who leased rail cars were asked about future leasing intentions. Almost one-half (46 percent) of the 50 survey respondents indicated that they would not renew covered hopper car lease agreements (Table 17). Reasons given for not intending to lease in the future were: "rail cars are now available;" "lease costs are too high;" "rail service will be lost;"

TABLE 17. REASONS GIVEN BY COUNTRY ELEVATOR MANAGERS FOR NOT INTENDING TO RENEW LEASE AGREEMENTS FOR COVERED HOPPER CARS IN THE FUTURE, 1981

Reason	Number Responding	Percent of Total Sample	Percent of Respondents Indicating They Would Not Lease
Rail cars are available	10	20	44
Lease costs are too high	5	10	22
Losing rail service	3	6	13
Prefer truck service	1	2	4
No reason	4	8	17
Total	23	46	100

and "truck service is preferred." Ten of 23, or 44 percent, of the elevator operators who indicated they would not renew lease agreements in the future, cited the availability of rail cars as the deciding factor.

Five respondents indicated dissatisfaction with their lease agreements. Of these five, four indicated that the reason they were not satisfied was due to high lease costs, while the other respondent indicated insufficient turnaround times to various destinations. Three of the five respondents not satisfied with lease arrangements indicated they did not plan to renew their leases.

Turnaround times on leased hopper cars to various destinations were not sufficient for 19 respondents. Some respondents indicated dissatisfaction with turnaround times to more than one destination (Table 18). Hence, 17

TABLE 18. TURNAROUND TIMES TO VARIOUS DESTINATIONS BY COUNTRY ELEVATOR OPERATORS REPORTING INSUFFICIENT TIMES, NORTH DAKOTA, 1981

Destination	Number of Respondents Reporting Insufficient Times	Turnaround Times		
		High	Low	Mean
		---number of days----		
Duluth/Superior	17	25	9	16.5
Minneapolis/St. Paul	9	30	11	16.7
Pacific Northwest	12	42	14	24.0

respondents reported insufficient turnaround times to Duluth/Superior while nine and 12 respondents reported dissatisfaction with times to Minneapolis/St. Paul and Pacific Northwest destinations, respectively.

Mean number of days reported by managers expressing dissatisfaction were 16.5, 16.7, and 24.0 days to Duluth/Superior, Minneapolis/St. Paul, and Pacific Northwest destinations, respectively. Mean values reported by the 50

respondents to the various destinations were 15.1, 16.1, and 24.1 days, respectively (Table 12). Consequently, managers expressing dissatisfaction had higher turnaround times to Duluth/Superior and Minneapolis/St. Paul destinations than those not expressing dissatisfaction. However, these differences were not significant.

Lease Versus Purchase of Covered Hopper Cars

This section contains an economic analysis of leasing and purchasing covered hopper cars. The analysis includes comparing net present values of various lease and purchase options. Two basic approaches are presented--analyzing cash flows and analyzing profitability.

Purchase or Lease

The decision to purchase or lease privately owned equipment is an important one. Purchase requires a substantial amount of capital investment, while leasing involves a somewhat greater degree of complexity. Each has its own advantages and managers must analyze each alternative carefully.

Net Present Value Analysis

Cash outlays and inflows were discounted using a net present value (NPV) approach to determine the profitability of various purchase and lease agreements. Net present value of one dollar in the future was computed as:

$$NPV = \frac{\$1}{(1 + i)^n}$$

Where NPV = net present value

i = discount rate

n = number of years or number of time periods

For example, NPV of one dollar five years from today at 12 percent interest (discount rate) would be:

$$NPV = \frac{\$1}{(1 + .12)^5} = \frac{\$1}{1.76} = \$0.57$$

Cash Flow Versus Profitability

Net present values of lease arrangements were analyzed on the basis of profitability. The lease option involved only one source of funds (mileage credits) and one use of funds (lease cost). Purchase options, however, were analyzed using both a cash flow and profitability framework. The cash flow analysis included depreciation as a source of funds while the profitability analysis calculated depreciation as a use of funds. The profitability scenario, therefore, accounted for capital replacement while the cash flow analysis did not.

Base Case

Because the number of possible outcomes was numerous, voluminous cash flow and profitability tables could have been generated. Therefore, a base case model was constructed and inputs were varied to determine the effects on net present values. The base case model was useful in identifying those variables that significantly affected cash flows and profitability. Input levels used in the base case model are presented in Table 19.

Description of Inputs

Purchase Price. The purchase price for a new jumbo hopper car used in the base case model ($45,000)[21] represents the approximate purchase price as of December 1981.

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[21]Based on personal communication with official at North American Car Corporation.

TABLE 19. COMPARISON OF NPV OF PURCHASING AND LEASING HOPPER CARS (BASE CASE)

Inputs:	Hopper Car Purchase Price	$45,000.00
	Utilization (in loaded miles per year)	13,000.00
	Mileage Allowance (in dollars per loaded mile)	0.3200
	Economic Life of Hopper Car (in years)	6.00
	Salvage Value (in dollars)	22,500.00
	Maintenance Cost (per year)	1,000.00
	Lease Payment (per year)	4,500.00
	Discount Rate (percent)	0.14
	Type of Depreciation	DDB
	Year in Which Investment Tax Credit is Taken	1.00
	Compound Interest Rate	0.03
	Tax Bracket	0.30

	Lease				Purchase				
Year	Revenue	Taxable Income	Profit After Taxes	Net Present Value	Revenue	Depr.	Taxable Income	Net Cash Flow After Taxes	Net Present Value
	in dollars				in dollars				
1	4160.	-340.	-238.	-209	4160.	7500.	-4340.	8962.	7860.
2	4285.	-215.	-151.	-116	4285.	6250.	-2965.	4174.	3210.
3	4413.	- 87.	- 61.	- 41	4413.	5208.	-1795.	3952.	2667.
4	4546.	46.	32.	19	4546.	4340.	- 795.	3784.	2240.
5	4682.	182.	127.	66	4682.	3617.	65.	3663.	1901.
6	4823.	323.	226.	103	27323.	3014.	23308.	19330.	8814.
Sum	26358.	-91.	-64.	-177	49409.	29930.	13479.	43865.	26693.

Net Present Value of Purchasing Hopper Car	-$18,307.20
Net Present Value of Leasing Hopper Car	-$ 177.00

Utilization. Hopper car utilization, expressed in loaded miles per year, was based on car cycle times reported by the elevator managers responding to the questionnaire, distance from terminal market, idle time, active car days, and number of trips to terminal markets.

According to the Interstate Commerce Commission (ICC), freight cars spend an average of 346 days per year in active service.[22] Elevator managers estimated average idle times to be 41 days per year for their leased hopper cars. Based on these figures, the "average" leased hopper car would spend 305 days (346 - 41) in active service. Average turnaround times, as reported by the elevator managers, were 15 days to Duluth, 16 days to Minneapolis, and 24 days to Pacific Northwest (PNW) destinations. Average distances from the respondent elevators to these markets were approximately 400 miles to Minneapolis and Duluth and 1,500 miles to PNW. Assuming two trips east for every trip west, the hopper car would travel 2,300 loaded miles every 55 days or about 13,000 miles per year($\frac{305}{55}$ * 2,300 = 12,755).

Mileage Allowance. The mileage allowance for the base case was assumed to be 32 cents per loaded mile. This figure represents a rough average, assuming one-half single car shipments (39.45 cents per loaded mile) and one-half multiple car shipments (24 cents per loaded mile). The mileage allowance (32 cents) was multiplied times the loaded mileage (utilization) to determine revenues. Revenues could not exceed the cost of the lease for lease arrangements since this was a provision often stipulated in lease agreements by car leasing companies.

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[22]Decision, Ex Parte No. 334, Car Service Compensation-Basic Per Diem Charges-Formula Revision in Accordance with the Railroad Revitalization and Regulatory Reform Act of 1976, (per Diem), August 10, 1977.

Economic Life. The economic life of the hopper car refers to the term (in years) being analyzed. Six years was used in the base case and approximates lease terms that were common among elevators in 1981. The 15 year period allows for analyzing long-term purchase and lease arrangements.

Salvage Value. It is difficult to determine an accurate residual value of hopper cars in the future. A rather conservative price of $22,500 was used in the base case.

Maintenance. Cost of maintenance was assumed to be $1,000 per year. Maintenance applies only to purchase options.

Lease Payment. The lease payment was assumed to be $375 per month or $4,500 per year. This figure represents the approximate lease rate in December 1981 for a full service lease.[23]

Other Inputs. The discount rate used was 14 percent. Double-declining balance was used for depreciating the asset. Investment tax credit was taken in the first year. Revenues were assumed to increase at 3 percent per year and the assumed tax rate was 30 percent.

Net present values for the base case model were -$177 for the lease option and -$18,307 for the purchase arrangement (Table 19). The NPV resulting from the purchase (profitability analysis) of the hopper car was -$39,028 for the base case model (Table 20). The preferred alternative, assuming the base case constraints, would be to lease, since negative net present values would be minimized.

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[23]Based on personal communication with Account Manager, North American Car Corporation.

TABLE 20. NET PRESENT VALUE OF GAIN (LOSS) FROM THE PURCHASE OF A HOPPER CAR (BASE CASE)

Year	Revenue	Depr.	Taxable Income	Profit After Taxes	Net Present Value
	----------	----------	in dollars	----------	----------
1	4160.	7500.	- 4340.	1462.	1282.
2	4285.	6250.	- 2965.	- 2076.	- 1596.
3	4413.	5208.	- 1795.	- 1256.	- 848.
4	4546.	4340.	- 795.	- 556.	- 329.
5	4682.	3617.	65.	46.	24.
6	27323.	3014.	23308.	16316.	7440.
Sum	49409.	29930.	13479.	13935.	5972.

Net Present Value of Gain (Loss) From the Purchase of a Hopper Car -$39,027

Sensitivity Analysis

Most inputs in the NPV analysis were varied to certain degrees allowing for a sensitivity framework. Constraints, by variable, for the sensitivity analysis were as follows:

Hopper Car Purchase Price:	Variable
Utilization (in loaded miles per year):	Variable
Mileage Allowance (in dollars per loaded mile):	Variable
Economic Life of Hopper Car (in years):	6 or 15 years
Salvage Value (in dollars):	Variable
Maintenance Cost (per year):	Variable
Lease Payment:	Variable
Discount Rate (percent):	10, 14, or 18 percent
Type of Depreciaiton:	Straight line, double declining balance, or a combination of straight line and double declining balance
Year in Which Investment Tax Credit is Taken:	1 to 6
Compound Interest Rate:	Variable
Tax Bracket:	Variable

Effects of Changes in Input Levels

Input levels were varied to determine the effects on net present values (Table 21). In most cases, input levels were both decreased and increased from base case levels. For example, discounting cash flows in the base case yielded an NPV of -$18,307 for a hopper car with a purchase price of $45,000, while changing the purchase price to $40,000 and $50,000 resulted in NPV's of -$14,436 and -$22,178, respectively. Cash flows increased (decreased) when purchase price decreased (increased).

In terms of net present values, the lease option would have been the preferred alternative in all of the scenarios presented since the values were higher than for all purchase options. Changing various input levels altered net present values considerably in some instances. For example, decreasing (increasing) utilization by 5,000 miles decreased (increased) net present value of cash flows by $4,642 for the purchase option. For the lease scenario, net present values were -$4,819 and $1,033, respectively, for utilization rates of 8,000 and 18,000 loaded miles per year. Decreasing (increasing) purchase price by $5,000 increased (decreased) cash flows by $3,871. The purchase price, obviously, only affected the purchase option.

Positive net present values of cash flows were not obtained under the scenarios presented for the purchase option. In fact, the highest cash flow generated was -$13,665, assuming utilization of 18,000 miles per year. Table 22 depicts input levels necessary to achieve positive cash flows for a purchase arrangement. Net present value of cash flows of $963 was obtained by changing the following base case input levels: (1) utilization was increased from 13,000 miles to 20,000 miles; (2) mileage allowance was increased from 32 cents to 40 cents per loaded mile; (3) the discount rate was decreased from 14 percent to 10 percent; and (4) the compound interest rate was increased

TABLE 21. COMPARISON OF NET PRESENT VALUES FOR SELECTED INPUT CHANGES IN BASE CASE, CASH FLOWS, AND PROFITABILITY ANALYSES, LEASE VERSUS PURCHASE OF JUMBO COVERED HOPPER CARS

Variable Changed*	Lease		Purchase			
			Cash Flow		Profitability	
	Net Present Value	Change from Base Case	Net Present Value	Change from Base Case	Net Present Value	Change from Base Case
	dollars					
Base Case	- 177	----	-18,307	----	-39,027	----
Purchase Price:						
($40,000)	- 177	----	-14,436	+3,871	-32,854	+6,173
($50,000)	- 177	----	-22,178	-3,871	-45,200	-6,173
Utilization:						
(8,000 miles)	-4,819	-4,642	-22,949	-4,642	-43,669	-4,642
(18,000 miles)	1,033	+1,210	-13,665	+4,642	-34,385	+4,642
Mileage Allowance:						
(24¢/loaded mile)	-3,194	-3,017	-21,324	-3,017	-42,045	-3,018
(40¢/loaded mile)	695	+ 872	-15,289	+3,018	-36,010	+3,107
Economic Life:						
(15 years with $10,000 salvage value)	331	508	-16,506	+1,801	-40,392	-1,365
($15,000 salvage value)	331	508	-16,016	+2,291	-39,902	- 875
($30,000 salvage value)	331	508	-14,546	+3,761	-38,433	+ 594
Maintenance:						
($0/yr.)	- 177	----	-15,585	+2,722	-36,306	+2,721
($2,000/yr.)	- 177	----	-21,028	-2,721	-41,749	-2,722
Lease Payment:						
($6,000/yr.)	-4,260	-4,083	-18,307	----	-39,027	----

-CONTINUED-

TABLE 21. COMPARISON OF NET PRESENT VALUES FOR SELECTED INPUT CHANGES IN BASE CASE, CASH FLOWS, AND PROFITABILITY ANALYSES, LEASE VERSUS PURCHASE OF JUMBO COVERED HOPPER CARS (CONTINUED)

Variable Changed*	Lease		Purchase			
			Cash Flow		Profitability	
	Net Present Value	Change from Base Case	Net Present Value	Change from Base Case	Net Present Value	Change from Base Case
	dollars					
Discount Rate:						
(10 percent)	- 158	+ 21	-14,668	+3,639	-37,479	+1,548
(18 percent)	- 191	- 14	-21,300	-2,993	-40,247	-1,220
Depreciation:						
(straight line)	- 177	----	-20,149	-1,842	-34,729	+4,298
Investment Tax Credit						
(taken in year 3)	- 177	----	-19,216	- 909	-39,936	- 909
(taken in year 6)	- 177	----	-20,201	-1,894	-45,000	-5,973
Compound Interest Rate:						
(0)	- 925	- 748	-19,055	- 748	-39,776	- 748
(6 percent)	- 17	+ 160	-17,502	+ 805	-38,223	+ 804
Tax Rate:						
(0)	- 253	- 76	-17,438	+ 869	-38,159	+ 868
(50 percent)	- 127	+ 50	-18,886	- 579	-39,606	- 579

*Figures in parentheses represent the level to which the variable was changed.

TABLE 22. COMPARISON OF NPV OF PURCHASING AND LEASING HOPPER CARS

Inputs:	Hopper Car Purchase Price	$45,000.00
	Utilization (in loaded miles per year)	20,000.00
	Mileage Allowance (in dollars per loaded mile)	0.4000
	Economic Life of Hopper Car (in years)	6.00
	Salvage Value (in dollars)	22,500.00
	Maintenance Cost (per year)	1,000.00
	Lease Payment (per year)	4,500.00
	Discount Rate (percent)	0.10
	Type of Depreciation	DDB
	Year in Which Investment Tax Credit is Taken	1.00
	Compound Interest Rate	0.08
	Tax Bracket	0.30

	Lease				Purchase				
Year	Revenue	Taxable Income	Profit After Taxes	Net Present Value	Revenue	Depr.	Taxable Income	Net Cash Flow After Taxes	Net Present Value
	In Dollars								
1	8000.	3500.	2450.	2227.	8000.	7500.	-500.	11650.	10590.
2	8640.	4140.	2898.	2394.	8640.	6250.	1390.	7223.	5966.
3	9331.	4831.	3382.	2540.	9331.	5208.	3123.	7394.	5553.
4	1029.	-3471.	-2430.	-1664.	10078.	4340.	4737.	7656.	5245.
5	0.	-4500.	-3150.	-1956.	10884.	3617.	6267.	8004.	4970.
6	0.	-4500.	-3150.	-1777.	34255.	3014.	30241.	24182.	13639.
Sum	27000.	0.	0.	1763.	81187.	29930.	45258.	66110.	45963.

Net Present Value of Purchasing Hopper Car	$ 963
Net Present Value of Leasing Hopper Car	$1,763

from 3 percent to 8 percent. Consequently, in order to attain positive cash flows for the six-year purchase option, revenues had to be increased significantly compared to the base case.

Per Bushel Cost of Leasing

It may be useful to elevator managers to determine the per bushel cost of their leased equipment. Two separate costs may be calculated based on: (1) the total bushel volume of the elevator (C_1); and (2) the number of bushels shipped in the leased equipment (C_2). The first cost (C_1) may be calculated as follows:

$$C_1 = \frac{LC - (LM*MC)}{V}$$

Where: C_1 = Per bushel cost

LC = Annual lease cost

LM = Loaded mileage

MC = Mileage credit in cents per loaded mile

V = Annual grain volume of the elevator

For example, assuming a lease cost (LC) of $430 per month,[24] elevator volume (V) of 750,000 bushels and a mileage credit (MC) of 32 cents per loaded mile,[25] the cost would be .24 cents per bushel. Assuming a lease cost of $375 per month yields a cost of .15 cents per bushel.

The second cost (C_2) may be calculated based on: (1) the number of car days available for active service; (2) average turnaround times reported by lessees; (3) proportion of grain shipped to the various markets; and

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[24]This figure ($430) represents the mean lease payment reported by elevator managers leasing hopper cars. See Table 8, page 22.

[25]This figure (32¢) represents an approximate average of the maximum single car mileage credit (39.45¢) and the multiple car mileage credit (24¢).

(4) the average distance to the markets (Table 23). Based on these figures, C_2 may be calculated as:

$$C_2 = \frac{LC-(LM*MC)}{\sum_{i=1}^{n}\left[(CD_i \div TA_i) * P_i * HC\right]}$$

Where: C_2 = Per bushel cost

LC = Annual lease cost

LM = Loaded mileage

MC = Mileage credit in cents per loaded mile

CD_i = Active car days available for service to the ith market

TA_i = Turnaround time to the ith market

P_i = Proportion of grain shipped to the ith market

HC = Hopper car capacity in bushels

n = Number of markets

TABLE 23. ESTIMATED ANNUAL UTILIZATION OF LEASED HOPPER CARS BY COUNTRY ELEVATORS

Destination	Active Car Days Available For Service		Reported Turnaround		Proportion of Grain Shipments[a]		Average Distance to Market		Expected Utilization (loaded mileage)
	----Number of Days----				---Pct.---		----------Miles----------		
Duluth/ Superior	305	÷	15	*	46	*	450	=	4,200
Minneapolis/ St. Paul	305	÷	16	*	20	*	450	=	1,700
Pacific Northwest	305	÷	13	*	10	*	1,500	=	1,900
Other	305	÷	19	*	24	*	700	=	2,700
Estimated Utilization									10,500

[a]Based on the proportion of all grain shipped to the various markets as reported by Griffin, Gene C., North Dakota Grain and Oilseed Transportation Statistics 1980-81, UGPTI Report No. 42, Upper Great Plains Transportation Institute, North Dakota State University, Fargo, March 1982.

Assuming a lease cost of $430 per month and a mileage credit of 32 cents per loaded mile, the per bushel cost (C_2) would be 2.81 cents. Reducing the lease cost to $375 per month results in a cost of 1.78 cents per bushel. It should be noted that these costs are based on averages of all grain shipments for crop year 1980-81. These costs could increase or decrease depending on equipment utilization. For instance, if elevator managers shipped leased cars exclusively to the Pacific Northwest, they may realize lower per bushel costs relative to shipping to all of the markets. It is extremely important that elevator managers carefully evaluate each market when determining where to market grain shipped in leased equipment. Frequently, turnaround times (and resultant revenues) in one market may offset price differentials in the other markets. Shipping leased hopper cars to markets with quicker turnaround times may offset adverse price differentials relative to other markets.

Summary and Conclusions

Summary

The purpose of this study was to examine the use of privately owned leased hopper cars by grain elevators in North Dakota. Specific objectives were to:

1. describe rail car leasing authority;
2. evaluate the utilization of leased hopper cars; and
3. compare the economics of leasing versus purchasing covered hopper cars.

Rail Car Leasing Authority

The use of privately owned covered hopper cars has increased dramatically in recent years. Approximately 40,000 privately owned covered

hopper cars were in use in the United States in 1970. This number had grown to over 100,000 by 1981. Shippers provided about 40 percent of all jumbo covered hopper cars in use either through outright ownership or lease arrangements in 1981.

Shippers must receive "use" authority in order to use privately owned rail equipment (except for tank cars) on railroad lines. This authority is commonly called OT-5. Application for authority and reporting marks is directed through the Association of American Railroads (AAR). The application is subsequently forwarded by the AAR to the particular carrier(s) involved for approval or disapproval. The shipper may place and utilize the privately owned equipment for transporting his products if the application is approved by the participating railroad(s). Shippers are compensated by the railroad for equipment use. This compensation is in the form of mileage credits and varies depending upon the type of mileage credits, the type of movement, and value and age of the rail car involved. Mileage credits are normally limited to the amount of the lease but are unlimited if the shipper owns the equipment.

Leased Equipment in North Dakota

The use of leased covered hopper cars by grain elevators in North Dakota is fairly common. About 30 percent of all elevators in the state leased hopper cars in 1981. The mean lease payment was $430 per month per car and varied from a low of $195 to a high of $550. Respondents to the mail questionnaire leased an average of seven hopper cars each.

Shipments of hard red spring wheat, durum, and barley in leased hopper cars accounted for approximately 45 percent of all rail shipments during 1980-81 for those elevator managers responding to the survey. Specific market outlets for grain shipped via leased equipment were reported by only seven

managers. Minneapolis/St. Paul and Pacific Northwest destinations were most frequently listed as specific outlets.

Turnaround times for the leased equipment were reported to be 15 days to Duluth/Superior, 16 days to Minneapolis/St. Paul, and 24 days to the Pacific Northwest. These average car cycle times compared with the highest economic-engineering estimates--14 days for eastbound movements and 24 days for westbound movements. Consequently, average actual turnaround times for leased equipment approximated times derived by economic-engineering techniques.

Almost half of the survey respondents indicated that they would not renew rail car leasing agreements in the future. Most indicated that the current car surplus was the primary factor in this consideration. Grain shippers appear to be less willing to lease rail equipment since rail car shortages have reverted to surpluses.

Lease Versus Purchase of Covered Hopper Cars

Analysis of net present values (NPV) of cash flows and profitability for various lease and purchase scenarios indicated that leasing of covered hopper cars would be the least-cost alternative. Net present values for the lease options were higher than those for purchase options for all scenarios analyzing selected input level changes. In all cases (lease and purchase) net present values were either zero or negative, indicating that utilization of privately owned equipment would have to be extremely high in order to return a profit on the investment.

Conclusions

Use of leased rail equipment increased throughout much of the 1970s and early 1980s as frequent rail car shortages persisted. However, since early

1981, shortages have turned into surpluses and private rail leasing companies and others may feel the pinch. Essentially, many grain elevator managers perceive that railroads have the capability to supply grain cars in adequate numbers and no longer feel the need to lease equipment in order to assure equipment supply. Leased hopper car use by grain elevators in North Dakota could decline by as much as 50 percent if equipment surpluses continue.

The relative profitability of owning and/or leasing jumbo covered hopper cars is not favorable for country elevators. Investment in privately owned equipment (either lease or purchase) represents additional costs to the elevator. It is extremely difficult for elevator managers to cover lease or ownership costs from direct revenues (mileage credits) earned from equipment utilization. This is much more arduous given the seasonal nature of grain flows. Equipment investment, however, may be justified in the sense that elevator managers may be able to improve grain marketing capabilities by guaranteeing transportation equipment. Direct losses realized through investment in privately owned equipment may be offset by indirect gains, such as improved marketing efficiency and flexibility. This is especially true when railroad-owned grain transportation equipment is in short supply.

Country elevator operators' attitudes towards rail car leasing appear to be changing. Almost one-half of the survey respondents indicated that they may not lease covered hopper cars in the future. This shift in attitude may be explained, in part, by the current grain rail transportation equipment surplus. It is evident that some lessees of hopper cars are not getting sufficient utilization from their leased equipment. Many lessees intend to surrender privately owned equipment and rely on the transportation industry to supply the equipment and service.

APPENDIX A

MAIL SURVEY

NORTH DAKOTA GRAIN HANDLING AND MERCHANDISING STUDY

-confidential-

1. Do you lease hopper cars? _____ yes _____ no

   How many? _____

2. If yes, from what railroad or car leasing company?

   _____

3. What railroad transports your leased hopper cars? _____

4. What are the capacities, leasing costs, average ages and mileage or other credits associated with your leased hopper cars?

	Number of Cars	Capacity (cubic feet, tons) Cubic Ft.	Tons	Basic Lease Cost (Per Car)	Average Age (Per Car)	Length of Lease	Mileage or other credi
Example:	5	4,750	100	$523/month	5 yrs.	10 yrs.	.3314/mile
Example:	4	4,750	95	490/month	8 yrs.	5 yrs.	.2384/mile
Example:	2	4,750	100	510/month	3 yrs.	5 yrs.	.2400/mile
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____

5. Are there any other charges for the leased hopper cars such as a high utilizatio charge, rental charge for idle cars on rail siding, insurance, etc.

   _____ yes _____ no If yes, please list the charges and reasons for the charge.

	Charge	Reason
Example:	$200/yr.	Insurance
Example:	$100 at 2½¢/mile	High utilization charge for mileage over 20,000 miles
	_____	_____
	_____	_____
	_____	_____
		_____
		_____
		_____

Are these costs per car, per fleet or other? _____ per car _____ per fleet _____ other. If other, please explain _____

_____

_____

6. What percent of total rail shipments did you ship by leased hopper for the following grains from July 1980 to June 1981?

Wheat _____%

Barley _____%

Oats _____%

Durum _____%

Sunflower _____%

Please list other grains and percentages:

_____ _____%

_____ _____%

_____ _____%

_____ _____%

7. Do you have a specific market(s) for grain shipments by leased hopper?

_____ yes _____ no. If yes, why? _____

_____

Please circle the market or markets.

a. Duluth/Superior b. Mpls/St. Paul c. Other Minnesota

d. Sioux City/Omaha/Kansas City e. East and South States f. Midland and Southwest States g. Pacific Northwest h. Other (specify) _____

8. What are the approximate mileages of your leased hopper cars? (If you lease from a car company such as North American Car, most of these mileages can be obtained from the Lessee Mileage Detail)

Quarter	Loaded Miles	Empty Miles
Jul-Sep 1980	_____	_____
Oct-Dec 1980	_____	_____
Jan-Mar 1981	_____	_____
Apr-Jun 1981	_____	_____

9. What are the average turnaround times of your leased hopper cars to the various markets?

	Destination	Average Turnaround (Days)
Example:	Duluth/Superior	14 days
Example:	Pacific Northwest	12 days
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

10. Are you satisfied with your lease agreement(s)? _____ yes _____ no

If no, please explain. _____

_____

11. Will you lease again when your current lease (s) expire (s)? _____ yes

_____ no Please explain_____

_____

_____

12. How long are your leased hopper cars idle during an average year?_____

_____

Is this idle time per car or per fleet? _____ per car _____ per fleet.

13. Are you satisfied with the turnaround time of your leased hoppers? _____ yes

_____ no. Please explain _____

_____

_____

_____

14. Do you feel that the leased hopper cars have aided your elevator in the marketing of grain? _____ yes _____ no. Please explain

_____

_____

_____

15. How would the merchandising of grain by your elevator change if the railroads would not allow leased cars on the line? _____

_____

_____

_____

_____

If you have any other comments concerning this study please feel free to include them:

Comments:_____

_____

_____

_____

_____

_____

_____

Thank you very much for the time and attention you devoted to this questionnaire. Your answers will be held in strict confidence. If you would like a copy of the study results please include the elevator name and address:

Name: _____

Address: _____

City and State:_____Zip_____

APPENDIX B

APPLICATION FOR OT-5 AUTHORITY
AND
CAR LEASING AGREEMENT

APPLICATION FOR AUTHORITY TO PLACE PRIVATELY OWNED FREIGHT CARS (OTHER THAN TANKS) IN SERVICE UNDER THE PROVISIONS OF AAR CIRCULAR OT-5-SERIES

FORWARD TO:

J. J. ROBINSON, EXEC. DIR. & SECRETARY
OPERATING-TRANSPORTATION DIVISION
ASSOCIATION OF AMERICAN RAILROADS
20TH & L STREETS. N. W.
WASHINGTON, D. C. 20006

DATE_____

CAR OWNER | LESSEE/SUBLESSEE | EXPIRATION DATE OF LEASE

REPORTING MARK | NUMBER OF CARS | CAR NUMBERS

COMMODITY(S) TO BE SHIPPED | IF DANGEROUS OR HAZARDOUS MATERIAL, STATE CLASSIFICATION

INDIVIDUAL RESPONSIBLE FOR CAR DISPOSITION (NAME & COMPANY) | AREA CODE TELEPHONE NO. EXT.

ARE CARS REGISTERED IN UMLER? YES OR NO ARE CARS LISTED IN EQUIPMENT REGISTER? YES OR NO
IF NO, ATTACH UMLER DOCUMENT.

IF UMLER DOCUMENT IS NOT ATTACHED. PLEASE FURNISH INFORMATION REQUESTED ON REVERSE SIDE

LIST BELOW, NAME OF INDUSTRY AND STATION(S) CARS ARE INTENDED TO BE APPROPRIATED FOR LOADING, NAMING ORIGINATING LINE HAUL CARRIER(S). IF CARS ARE SCHEDULED TO ORIGINATE LOADING ON A SWITCHING ROAD, NAME THIS ROAD ALSO. (SECTION II (c), OT-5-SERIES)

INDUSTRY	STATION	ORIGINATING CARRIER(S)

IF CARS HAVE BEEN PURCHASED SECONDHAND, ATTACH PERTINENT FORM 88-A-4-SERIES, FOR APPROVAL BY AAR MECHANICAL DIVISION. (SECTION II (b) OT-5-SERIES)

SUBMITTED BY:_____
SIGNATURE | TITLE | COMPANY

ADDRESS | CITY | STATE | ZIP CODE

AREA CODE | TELEPHONE NO. | EXT.

CAR INFORMATION

YEAR BUILT NEW & REBUILT_____

AAR CAR TYPE CODE	MECHANICAL DESIGNATION	CUBIC CAPACITY
TARE WEIGHT	NOMINAL CAPACITY	TRUCK CAPACITY
BEARINGS "F" OR "R"	TOTAL WEIGHT ON RAIL	LENGTH OVER COUPLERS
EXTREME WIDTH & HEIGHT	HEIGHT TO EXTREME WIDTH	TRUCK CENTER LENGTH
AXLE SPACING	NUMBER OF AXLES	AAR PLATE SIZE

DESCRIPTION OF SPECIAL CAR FEATURES AND/OR ADDITIONAL COMMENT:

FOR RAILROAD USE ONLY DATE_____

THE_____HAS REVIEWED THIS APPLICATION AND IS ( ), IS NOT ( ) AGGREABLE TO ACCEPT THESE CARS IN THE SERVICE OUTLINED UNDER THE PROVISIONS OF AAR CIRCULAR OT-5-SERIES. COMMENTS:

_____
SIGNATURE

_____
TITLE

_____
RR. OR RY.

AAR CIRCULAR NO. OT-5-SERIES APPROVAL

Date:_____
Copy Fwd:_____
Refers Yours:_____
CC:_____
J. J. Robinson,
Executive Director.

CAR LEASING AGREEMENT

This Agreement, dated by and between (hereinafter called), and corporation, with its principal place of business at (hereinafter called "Lessee"),

WITNESSETH:

1. agrees to furnish and lease to Lessee, and Lessee agrees to accept and use upon the terms and conditions herein set forth, the cars covered by the riders attached hereto and such additional riders as may be added hereto from time to time by agreement of the parties, and any and all other cars delivered to and accepted by Lessee. Each such rider shall set forth the number of cars, the rental rate, term of use, car numbers, and other pertinent information that may be desired by both parties. All cars leased pursuant to such riders, or otherwise delivered to and accepted by Lessee, are subject to the terms of this Agreement.

2. agrees to deliver the cars to Lessee at a point or points designated by Lessee. obligation as to such delivery shall be subject to all delays resulting from causes beyond its control. Lessee agrees to use the cars exclusively in its own service, except as hereinafter provided, and none of the cars shall be shipped beyond the boundaries of the United States or Canada except with the prior written consent of . Lessee agrees that if any of the cars are used outside of Continental United States, Lessee shall reimburse for any customs duties, taxes, investment tax credit reductions or other expenses resulting from such use.

3. Lessee agrees to pay the rental charges with respect to each of the cars from the date of delivery thereof and until such car is returned to and accepted by . Such rental charges shall be paid to at its principal office, in advance on the first day of each month, prorating, however, any period which is less than a full month.

4. Each of the cars shall be subject to Lessee's inspection upon delivery to Lessee. Failure to report any defect in the car within a reasonable time after delivery of the car or the loading of each such car by Lessee or at its direction shall constitute acceptance thereof by Lessee, and shall be conclusive evidence of the fit and suitable condition thereof for the purpose of transporting the commodities then and thereafter loaded therein or thereon.

5. agrees to keep records pertaining to the movement of the cars, and Lessee agrees to promptly furnish with complete reports of the car movements, including dates received, loaded and shipped, commodity, destination, and full junction routing, and all information which Lessee may receive from railroad companies or other sources which may be of use to shall collect the mileage earned by the cars, and, subject to all rules of the tariffs of the railroads, shall credit to Lessee's rental account such mileage as and when received from the railroads,

but in no event shall the aggregate amount of mileage credited exceed the aggregate monthly rentals for the term of this agreement. Mileage earnings for all cars covered by this Agreement shall be carried in a consolidated account.

6. Lessee agrees to reimburse for any payment may be required to make to any railroad, due to mileage equalization where applicable, resulting from excess empty mileage incurred by the cars on such railroad. For the purpose of this paragraph the railroad mileage and junction reports shall be prima facie evidence of the facts reported therein. In addition, if is required to make any payments to a railroad resulting from the empty movement of any of the cars while they are in Lessee's service, Lessee agrees to reimburse for such payments.

7. Lessee shall promptly notify upon receipt by Lessee of knowledge of any damage to any of the cars. agrees to pay for the maintenance and repair of the cars, except as hereinafter provided. Lessee shall not repair, or authorize the repair of, any of the cars without prior written consent, except that running repairs (as specified in the Association of American Railroads Rules for Interchange) may be performed without prior written consent. The amount will pay for such running repairs shall not be in excess of the basis, in effect at the time the repair is made, provided by the Association of American Railroads. If any car becomes unfit for service and shall be held in a car shop for repairs and shall remain therein for a period in excess of five days, the monthly rental with respect to such car shall abate from and after such period of five days until such car is released from the shop or until another car shall have been placed in the service of Lessee by in substitution for such car. It is understood that no rental credits will be issued for cars in a shop for repairs which are Lessee's responsibility.

8. In the event any car is totally damaged or destroyed, the rental with respect to such car shall terminate upon receipt by of notification thereof, and in the event any car is reported to be bad ordered and elects to permanently remove such car from Lessee's service rather than have such car taken to a car shop for repairs, the rental with respect to such car shall terminate upon receipt by of notification that such car was bad ordered. shall have the right, but shall not be obligated, to substitute for any such car another car of the same type and capacity and the rental in respect to such substituted car shall commence upon delivery of such substituted car to Lessee.

9. In the event that any of the cars, or the fittings, appliances or appurtenances thereto, shall be damaged, ordinary wear and tear excepted, or destroyed either as a result of the acts of any of Lessee's employees, agents or customers or from any commodity or other material loaded therein or thereon, Lessee agrees to assume financial responsibility for such damage or destruction.

10. shall not be liable for any loss of or damage to commodities, or any part thereof, loaded or shipped in or on the cars, and Lessee agrees to assume financial responsibility for, to indemnify against, and to save it harmless from any such loss or damage.

11. Lessee, at its own expense, shall either replace or reimburse for the cost of replacing any appliance or removable part, if destroyed, damaged, lost, removed or stolen, unless the railroads transporting the cars have assumed full responsibility for such loss or damage, or unless such loss or damage results from the negligence or omission of , its agents or employees.

12. The application, maintenance and removal of interior protective lining in any of the cars is to be performed by and at the expense of Lessee unless otherwise specifically provided for in the applicable rider.

13. Lessee agrees to indemnify and hold harmless from and against any loss,liability, claim, damage or expense (including, unless Lessee assumes the defense, the reasonable cost of investigating and defending against any claim for damages) arising out of or in connection with the use of the cars during the term of this Agreement, excepting, however, any loss, liability, claim, damage or expense which accrues with respect to any of the cars (i) while such car is in a repair shop undergoing repairs; (ii) which is attributable to the negligence or omission of , its agents or employees; or (iii) for which a railroad or railroads have assumed full responsibility, including investigating and defending against any claim for damages.

14. No lettering or marking of any kind shall be placed upon any of the cars by Lessee except with the prior written consent of .

15. Lessee agrees not to load any of the cars in excess of the load limit stenciled thereon.

16. Lessee shall be liable for any demurrage, track storage or detention charge imposed in connection with any of the cars as well as loss of or damage to any car while on any private siding or track or on any private or industrial railroad or in the custody of any carrier not subject to the Association of American Railroads Rules for Interchange.

17. Lessee shall make no transfer or assignment of its interest under this Agreement in and to the cars without prior consent, except that Lessee may sublease any of the cars to its customers for single trips consistent with its normal merchandising methods; provided, however, that notwithstanding any such sublease, Lessee shall continue to remain liable to under all conditions and terms of this Agreement. No right, title or interest in any of the cars shall vest in Lessee by reason of this Agreement or by reason of the delivery to or use by Lessee of the cars, except the right to use the cars in accordance with the terms of this Agreement.

18. If Lessee shall fail to perform any of its obligations hereunder, at its election may either (a) terminate this Agreement immediately and repossess the cars, or (b) withdraw the cars from the service of Lessee and deliver the same, or any thereof, to others upon such terms as may see fit. If shall elect to proceed in accordance with clause (b) above and if during the balance of the term of this Agreement shall fail to collect for the use of the cars a sum at least equal to all unpaid rentals hereunder to the states date of termination hereof plus an amount equal to all expenses of withdrawing the cars from

the service of Lessee and collecting the earnings thereof, Lessee agrees to pay from time to time upon demand by the amount of any such deficiency. It is expressly understood that at its option may terminate this Agreement in the event that a petition in bankruptcy or a petition for a trustee or receiver be filed by or against Lessee or in the event that Lessee shall make an assignment for creditors.

19. Upon the termination of each rider, Lessee agrees, subject to the provisions of paragraph 8 above, to return the cars to at the final unloading point or at such other place or places as are mutually agreed to, in the same or as good condition as received, ordinary wear and tear excepted, free from all charges and liens which may result from any act or default of Lessee, and free from all accumulations or deposits from commodities transported in or on the cars while in the service of Lessee. If any car is not returned to free from such accumulations or deposits, Lessee shall reimburse for any expense incurred in cleaning such car.

20. agrees to assume responsibility for and to pay all property taxes levied upon the cars and to file all property tax reports relating thereto. Lessee agrees to assume responsibility for and to pay any applicable state sales, use or similar taxes resulting from the lease or use of the cars.

21. It is understood that some of the cars furnished Lessee under this Agreement and rights under this Agreement may, at the time of delivery to Lessee or at some future time during the term of this Agreement, be subject to the terms of a mortgage, deed of trust, equipment trust, pledge or assignment or similar security arrangement. Lessee agrees that the cars may be stenciled or marked to set forth the ownership of any such cars in the name of a mortgagee, trustee, pledgee, assignee or security holder and that this Agreement, and Lessee's rights hereunder, are and shall at all times be subject and subordinated to any and all rights of any mortgagee, trustee, pledgee or security holder. As to the cars subject hereto, this Agreement and the rentals hereunder may have been assigned and may in the future be assigned to the holder, if any, of the superior lien from time to time on each car as determined with reference to the filings under Section 20c of the Interstate Commerce Act; however, until notified to the contrary by any person reasonably proving to Lessee's satisfaction that he is the assignee of this Agreement or the rentals hereunder, Lessee is to pay all rentals to the order of . Lessee hereby consents to accepts such assignment. Lessee agrees that no claim or defense which Lessee may have against shall be asserted or enforced against any assignee of this Agreement.

22. This Agreement shall be binding upon the parties hereto, their respective successors, assigns and legal representatives, and shall remain in full force and effect from the date hereof until the completion of the leasing arrangement shown on attached riders of the last car or cars hereunder, and all such cars are returned to

SEE ATTACHMENT "A"

IN WITNESS WHEREOF, the parties hereto have duly executed this agreement in two counterparts (each of which shall be deemed an original) the day and year first above written.

ATTEST:

_____ By _____

Assistant Secretary Sr. Vice President

ATTEST: _____

_____ By _____

Secretary President

ATTACHMENT "A"
Forming Part of

CAR LEASING AGREEMENT

23. Notwithstanding the provision of paragraph 19, it is understood and agreed that Lessee shall, at the termination of each rider, release the cars at a point or points designated by .

24. In the event the U.S. Department of Transportation, or any other governmental agency or non-governmental organization having jurisdiction over the operation, safety or use of railroad equipment, requires that add, modify or in any manner adjust the cars subject to this Agreement in order to qualify them for operation in railroad interchange, Lessee agrees to pay an additional monthly charge of $1.75 per car for each $100 expended by on such car, effective as of the date the car is released from the shop after application of such additions, modifications or adjustments (hereinafter the "Modifications"). No rental credits will be issued on cars entering the shop for any Modification for the first thirty days. In the event in its sole discretion determines prior to making any Modification that the cost thereof is not economical to expend in view of the estimated remaining useful life of such car, and elects to permanently remove such car from Lessee's service rather than have such car taken to a car shop for such Modification, the rental with respect to such car shall terminate upon the date specified in writing by provided that such date must be prior to the date the Modification is so required to be made.

Lessee agrees not to permit railroad reporting marks to be applied or remain on any of the cars unless expressly permitted by the terms of any rider or by other written consent of , and if such marks are placed on any cars:

(A) The first sentence of paragraph 20 of the aforesaid Agreement shall not apply, and Lessee agrees to assume responsibility for and to pay all taxes, assessments and other governmental charges levied or assessed upon or in respect of such cars or upon their use or Lessee's earnings arising therefrom with respect to all periods during which such reporting marks remain on the cars (exclusively, however, of any tax in the nature of an income tax on the net income from rentals on the cars) including without limitation all licenses and registration feeds, assessments and any sales, use or similar taxes payable on account of the leasing of the cars; but Lessee shall not be required to pay the same so long as Lessee shall in good faith and by appropriate legal or administrative proceedings contest the validity or amount thereof and rights and interests shall not be endangered. Lessee also agrees to duly file any and all reports or returns required to be filed with respect to any such taxes, assessments or charges. In addition, Lessee shall pay any penalties or interest thereon imposed by any state, provincial, federal or local government with respect to any such taxes, assessments, charges, reports or returns, and Lessee shall reimburse for any damages or expenses resulting from failure to pay or discharge any items to be paid under this paragraph.

(B) Paragraph 5 of the aforesaid Agreement will not be applicable with respect to said cars with respect to all periods during which such reporting marks remain on the cars. Lessee shall keep all records pertaining to the movement of the cars and will furnish monthly to complete reports of all mileage for each car, both on its lines and on the lines of other railroads, during such periods.

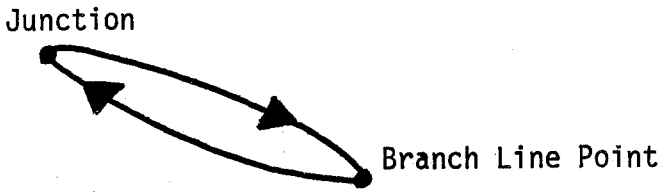
(C) Lessee shall be responsible, at its expense, for applying any allowed railroad reporting marks to any of the cars after delivery thereof to Lessee and for changing all railroad reporting marks and ACI labels on each car back to reporting marks and ACI labels designated by prior to the last loaded move of the cars in the railroad's service, and Lessee shall give at least sixty (60) days' prior written notice of the date of such last loaded move.

(D) Lessee shall be responsible for all charges and costs incurred in shipping the cars into a shop for repairs or required modifications and back to Lessee.

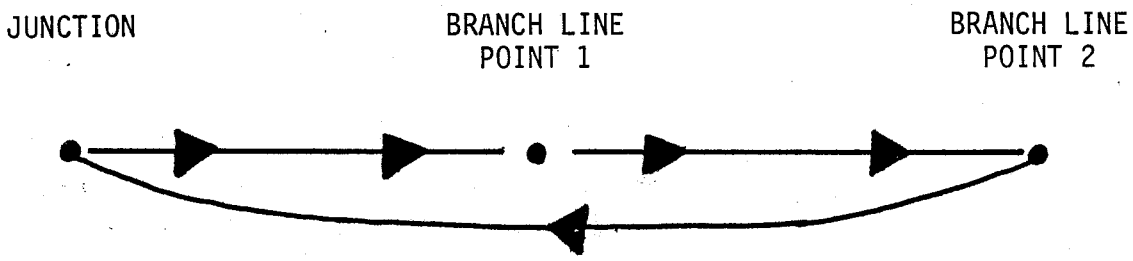
APPENDIX C

UNITED STATES RAILWAY ASSOCIATION, VIABILITY OF LIGHT-DENSITY RAIL LINES. CAR-DAYS SPENT ON BRANCH

ON-BRANCH ORIGINATION OR TERMINATION



	Frequency of Service (Days per week)						
	7	6	5	4	3	2	1
Days waiting at Junction	0	.14	.43	.57	.71	1.29	3
Days traveling from Junction to Branch Line Point	1	1	1	1	1	1	1
Days loading or Unloading at Branch Line Point	2	2	2	2	2	2	2
Days waiting at Branch Line Point	0	.5	1.2	1.25	1.67	3	4
Days travelling from Branch Line Point To Junction	1	1	1	1	1	1	1
TOTAL CAR DAYS	4	4.64	5.63	5.82	6.38	8.29	11.0



	Frequency of Service (Days per Week)						
	7	6	5	4	3	2	1
Days waiting at Junction	.5	.64	.93	1.07	1.21	1.79	3.5
Days traveling to Point 1	1	1	1	1	1	1	1
Days loading or unloading at Point 1	2	2	2	2	2	2	2
Days waiting service at Point 1	0	.5	1	1.25	1.67	3	4
Days traveling to Point 2	1	1	1	1	1	1	1
Days loading or unloading at Point 2	2	2	2	2	2	2	2
Days waiting service at Point 2	0	.5	1.	1.25	1.67	3	4
Days traveling from Point 2 to Junction	1	1	1	1	1	1	1
Days switching at Junction	.5	.5	.5	.5	.5	.5	.5
TOTAL CAR DAYS	8	9.14	10.43	11.07	12.05	15.29	19

List of Tables

List of Tables (Continued)